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IX. *An Inveſtigation of the Difference between the preſent Temperature of the Air in* Italy *and ſome other Countries, and what it was Seventeen Centuries ago: In a Letter to* William Watſon *M. D. F. R. S. by the Honourable* Daines Barrington *F. R. S.*

Dear Sir,

Read March 3, 1768.

I Troubled you lately to procure from your Son Mr. Watſon, who is now in Italy, ſome anſwers to certain queries with regard to the temperature of the ſeaſons which commonly prevails there at preſent, and particularly whether the rivers of that country have been remembered to have had their ſurface frozen over.

I have often put the ſame queſtion to many of thoſe who have made the tour of Europe, and have always been anſwered in the negative: as moſt Engliſhmen however travel before they pay attention to facts of this ſort, I was deſirous of procuring information from thoſe whoſe obſervations might be more depended upon.

I have long entertained a notion that the ſeaſons are become infinitely more mild in the Northern latitudes than they were 16 or 17 centuries ago; and from this it hath happened that many paſſages in the claſſical writers deſcriptive of the Severity of the climates, have ſtruck me more than they would perhaps a common reader.

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It will be immediately ſeen that the proofs of this aſſertion muſt depend upon accounts of the weather, and it's effects in places, the ſituation of which we know with ſome preciſion, and which may be compared with the common meteorological obſervations in the ſame latitudes and ſpots at preſent.

If this ſame queſtion ſhould be agitated two thouſand years hence, it might receive an abſolute demonſtration; as a journal of the changes in a well-conſtructed thermometer would ſhew the temperature which prevailed in any particular place, during the preſent century.

No ſuch accuracy can be expected from any paſſages in the claſſical writers; but in order to ſtate the alteration which may have happened in ſo long a courſe of years, the moſt proper method ſeems to be to compare their accounts with thoſe of more modern travellers, who have equally wanted the aſſiſtance of a thermometer for their obſervations.

I ſhall for ſeveral reaſons chiefly rely upon many of Ovid's letters from Pontus (though he was not only a poet, but a writer of moſt glowing fancy, and imagination), in which he deſcribes the effects of cold at Tomos * during his ſeven years reſidence there, and afterwards contraſt this deſcription with that of later travellers.

* It is ſo called by Ovid, who reſided there ſo long and underſtood the language of that country. It was however likewiſe ſtyled Tomis and Tomi, the latter of which ſeems to have been the more general appellation, as the adjective formed from it is Tomitanus. Beſides this, Ferrarius ſuppoſes it to be the ſame with the modern Temiſware, moſt evidently taken from the ancient name in the time of Ovid.

Ovid was born at Sulmo in Italy, about ninety Roman miles S. W. from the capital:

" Millia qui decies diſtat ab urbe novem."

He afterwards reſided chiefly at Rome, and was there at the time he received the Emperor's orders for his immediate baniſhment: I ſhall therefore conſider him as then leaving the 42d degree of Northern latitude, the climate in which he was born, and continued to live.

He was thence removed to Tomos, which Dr. Wells, in his maps of ancient geography, places only in the 44th degree of Northern latitude: the change was therefore only of two degrees, and yet Ovid immediately deſcribes the winter of Hudſon's bay.

But, before I particulariſe any of the paſſages which prove the intenſeneſs of the cold, which he there experienced, it may be objected that no credit is to be given to a melancholy poet, of a warm imagination and too exquiſite feelings.

This argument, I admit, would have great weight, if he only complained of the exceſſive and intolerable cold which prevailed. The maxim of law, however, holds equally in natural philoſophy* " *that he who* " *means to impoſe or miſrepreſent never deals in particu-* " *lar facts,*" eſpecially ſuch as admit of an immediate contradiction, and in which he could not himſelf be deceived.

He ſaw with his own eyes the Euxine ſea covered with ice:

" Vix equidem credar, ſed cum ſint præmia falſi
" Nulla, ratam teſtis debet habere fidem:
" Vidimus ingentem glacie conſiſtere Pontum."

Lib. III. El. 10.

* " Fraus verſatur in generalibus."

But if you will not credit what he ſaw, he afterwards mentions walking upon this ice:

" Nec vidiſſe ſat eſt, udum calcavimus æquor;
" Undaque, non *udo ſub pede*, ſumma fuit."

The ſea thus frozen, not only bore Ovid who hath deſcribed himſelf to be very light and agile, but oxen and carriages paſſed over it:

" Perque novos pontes, ſubter labentibus undis,
" Ducunt Sarmatici barbara plauſtra boves."

Lib. III. El. 10.

When the poor baniſhed poet, during this rigorous weather, wanted ſome generous wine to warm himſelf, it was preſented to him in a ſtate of congelation:

" Udaque conſiſtunt formam ſervantia teſtæ
" Vina, nec hauſta meri, ſed data fruſta, bibunt."

This effect of cold was not experienced in London, ſituated in the 52d degree of Northern latitude, during the great froſt in 1740.

Add to theſe proofs, that what he here mentions is not the effect of one particular hard and ſevere winter; he complains from year to year of nearly the ſame circumſtances:

" Ut ſumus in Ponto *ter* frigore conſtitit Iſter,
" Facta eſt Euxini *dura ter* unda maris."

Lib. I. El. 10.

The ſnow likewiſe in many places never diſſolved during the ſummer:

" Quæque nec hoſte fero, nec nive terra cares."

" Frigore perpetuo Sarmatis ora riget."

" Et ſolet in multis *bima* manere locis."

I think therefore that what I have preſumed to conjecture, may be reſted upon the ſingle teſtimony of

of Ovid; but, as there is with ſome ſo ſtrong prejudice againſt facts from ſuch a quarter, I ſhall endeavour to corroborate this authority, by deſcriptions of the ſame country, which we find in other writers of thoſe centuries.

His contemporary Virgil ſpeaks thus of the effects of cold in the ſame latitude:

" Cæduntque ſecuribus humida vina,
" Stiriaque impexis induruit horrida barbis."

Georg. Lib. III. l. 349. & ſeq.

He likewiſe aſſerts that the ſnow.

" ——— Septem aſſurgit in ulnas."

Virgil indeed is alſo unfortunately a poet; but his Georgics are perpetually relied upon as authority, not only by Pliny, but the later writers on huſbandry.

Such credit is given to our own great deſcriptive poet Thomſon, that the compilers of the Encyclopedie have almoſt entirely tranſlated his *Seaſons*, under the article *Zone:* nor is there perhaps a circumſtance mentioned throughout thoſe poems, which the moſt ſcrupulous, and minute naturaliſt may not rely upon.

I ſhall juſt mention the authority of one more poet, as he is ſcarcely more than a metrical geographer:

Dionyſius, in deſcribing the ſame country, ſpeaks thus of the ſnow's never melting:

Σχετλιοι οι περι κεινον ενοικια φωτες εχουσι.
Αιει σφιν ψυχρη τε χιων, δρυμος τε δυσαης.

Περιηγησις, l. 668.

I ſhall cloſe theſe corroborating proofs of the cold which was experienced at Tomos, by a paſſage from another geographer, who is ſufficiently proſaic not to admit of any objection, to his teſtimony, on account of a too lively imagination:

Απασα

Απασα δη χωρα δυσχειμερος εστι, των δε παγων η σφοδροτης μαλιστα εκ των συμβαινοντων περι το στομα της Μαιωτιδος δηλος εστι, αμαξευεται γαρ ὁ διαπλους, ὡστε και πλοον ειναι, και οδον. Strabo, L. 7.

Thus is Ovid ſupported in that very material and ſtriking fact of the ice being commonly ſtrong enough to bear carriages.

It now remains to compare this account of the ſeverity of the cold at Tomos, with that of more modern travellers, who have either been at the ſame place during the winter, or paſſed not very far diſtant.

Rubruquis, Marco Polo, Jean du Plan, Carpin, and Mandeville, were all of them on the borders of the Euxine Sea, and proceeded many degrees Northward; and yet we do not hear of any complaint with regard to the cold.

Buſbequius travelled from Buda to Conſtantinople, in the midſt of winter; nor does he mention any inconvenience, or interruption, from froſt or ſnow. If it be ſaid that his way did not lye through Tomos (or Temeſware), to this it may be anſwered, that he croſſed the ſame latitudes; to which it may be added, that there was no Euxine Sea to mitigate the ſeverity of the cold.

I muſt likewiſe here make another obſervation, that it does not appear either from Ovid, who is ſo very minute in every particular relative to this country, or from any other traveller, that there are high mountains in the neighbourhood of Tomos.

Tournefort was on the Black Sea, in the beginning of April, and dwells much upon the very fine weather during the time he continued upon it. He obſerves, however, that, in the time of Conſtantine, the ſtreight oppoſite to Byzantium was frozen over; and

that

that in the year 401 the Euxine Sea was covered with ice, for twenty days together. Theſe facts, therefore, ſtruck him, as extraordinary.

Mottraye was in Crim Tartary, in the year 1711, during the months of November and December; who is alſo entirely ſilent, with regard to any uncommon effects of cold.

Theſe are all the travellers, whoſe works I have looked into, or could procure on this occaſion. I do not take upon myſelf to ſay, that there may not be others, which have eſcaped me; but I ſhould not ſuppoſe the number to be great, as the Euxine Sea, and its neighbourhood, neither anſwers to the European traveller, in point of curioſity or commerce.

I have ſaid in the outſet, that I have ſome particular reaſons, for fixing chiefly on Tomos, to make this compariſon; which ariſes from the country being preciſely in the ſame ſtate that it was in the time of Ovid; this entirely excludes the common obſervation, *that the cultivation of a country will render the climate more temperate.*

We will now leave Tomos, and compare the accounts of the weather in Italy, with thoſe of the preſent times: it being firſt premiſed, that the country was better cultivated, in the Auguſtan age, than it is now, which ſhould conſequently have made the temperature of the air more warm than it is now experienced to be.

The queries propoſed to your ſon Mr. Watſon relate to this compariſon, and have occaſioned my troubling you with this length of letter, ſince I have within theſe few days been fortunate enough to procure, through other hands, the information I could have wiſhed on this head.

I ſhall

I ſhall begin with ſome paſſages from Virgil's Georgics, having already attempted to ſhew that no authority can be more relied upon.

This moſt excellent huſbandman is conſtantly adviſing precautions againſt ſnow and ice in the management of cattle; and he may be generally ſuppoſed to give theſe directions for the neighbourhood of Naples *, or Mantua his native country, where he does not evidently from the context mean ſome other parts of Italy:

" Et multâ duram ſtipulâ, filicumque maniplis
" Sternere ſubter humum, glacies ne frigida lædat
" Molle pecus." Lib. III. l. 297.

This relates to ſheep; but that hardy animal the goat wanted the ſame attention during the winter:

" Ergo omni ſtudio, glaciem, ventoſque nivales
" Avertes." Lib. III. l. 317.

Speaking afterwards of Calabria, the moſt Southern part of Italy, he expreſſes himſelf, with regard to the rivers being frozen, as what was commonly to be expected:

" Et cum triſtis hyems etiamnum frigore ſaxa
" Solveret, & glacie curſus frænaret aquarum †."

* " Illo Virgilium me tempore dulcis alebat
" Parthenope, ſtudiis florentem ignobilis otî."

† It appears alſo by the ſixth Satire of Juvenal, that the Tiber's being commonly frozen in winter ſupplied the ladies of Rome with a very extraordinary inſtance of implicit deference to the commands of the Egyptian prieſts:

" Hybernum fracta glacie deſcendet in amnem,
" Ter matutino Tiberi mergetur ——————"

Pliny's favourite villa of Laurentinum was ſituated near the mouth of the ſame river; and, in the very minute deſcription of its beauties and conveniences, he dwells much more upon the expoſition of different parts of it to the warmth of the ſun,

I am aſhamed to be obliged to ſtate ſo many authorities; but, as the proof entirely ariſes from many ſuch concurrent paſſages, I ſhall now ſupport the teſtimony of Virgil by that of two naturaliſts, who were either Italians, or reſided in Italy.

Pliny, in a chapter, *De natura cœli ad arbores*, and ſpeaking of Italian trees, ſays, "Alioqui arborum "frugumque communia ſunt, *nives diutinas ſedere.*" Lib. XVII. cap. 2.

But perhaps the ſtrongeſt proof of that very remarkable fact, the Italian rivers being conſtantly frozen over, is to be collected from a chapter in Ælian, which conſiſts entirely of inſtructions how to catch eels, whilſt the water is covered with ice: to this, without troubling you with a long citation, I ſhall barely refer. (See Lib. XIV. de Animal. cap. 29.)

Now, if we may believe the concurrent accounts of modern travellers, it would be almoſt as ridiculous to adviſe a method of catching fiſh in the rivers of Italy, which depended entirely upon their commonly being frozen over, as it would be to give ſuch directions to an inhabitant of Jamaica.

I likewiſe cannot find that the precautions, which Virgil gives in his Georgics, againſt the damage which ſheep and goats might receive from the ſnow and froſt, are now neceſſary; and both theſe animals are known to ſtand the ſevereſt winters of the High-

than its coolneſs, which is the circumſtance moſt attended to, even in our northern climate.

He alſo mentions, that the ſituation was not warm enough either for olives or mirtle; and that the *laurus* (which, whether it be the *bay* or *laurel*, bears our climate, except in ſeaſons of extraordinary ſeverity) would not then frequently ſtand the whole winter, neither at Laurentinum, nor near the town of Rome.

lands

lands of Scotland, conceived to be in Virgil's time almoſt the *ultima Thule*.

I do not pretend however to aſſert from this, that ſnow does not lye upon the Alps and Apennines, which ariſes from their very conſiderable height, nor that ſome waters on the tops of ſuch mountains, or perhaps nearly under them, may not be frozen, eſpecially when they are at a great diſtance from the ſea.

We ſhall find however that the climate hath likewiſe, upon theſe very ſummits, become proportionably mild with that of the more level countries.

This receives a very clear and ſatisfactory proof, from the difficulties which thoſe formerly encountered who paſſed the Alps.

Every line, almoſt, of both Livy's and Polybius's deſcription of Annibal's paſſage, makes mention of froſt and ice; we know that theſe mountains have been eaſily croſſed ſince by armies, from the time of Francis the firſt, to the war of 1743. They are likewiſe paſſed ſometimes even by conſumptive travellers during the winter.

It is now time, perhaps, to releaſe you from this very long diſſertation; on a point, however, which ſeems to be of ſome curioſity and importance. I am,

Dear Sir,

Your moſt faithful,

humble ſervant,

Daines Barrington.